extracting a plurality of pixels of image data of a first hierarchy for learning and generating class information corresponding to the characteristics of the extracted plurality of pixels;

predicting image data of the second hierarchy where a number of pixels for the image data of the first hierarchy for learning is reduced, using the image data of the first hierarchy for learning and mapping coefficients corresponding to the class information;

predicting the image data of the first hierarchy for learning in accordance with the coded data and generating predicted data having a plurality of predicted pixels;

generating a predicted error of the predicted data of the image of the first hierarchy for learning with respect to the image data of the first hierarchy for learning;

updating the mapping coefficients in accordance with the predicted error until the mapping coefficients are optimum mapping coefficients; and

determining the optimum mapping coefficients.

23. An apparatus according to claim 17, wherein the mapping for each class is generated by the steps of:

forming an image data of the second hierarchy having a number of pixels that is smaller than that of an image data of the first hierarchy for learning;

correcting the image data of the second hierarchy and generating a corrected data;

predicting the image data of the first hierarchy for learning in accordance with the corrected data and generating a predicted data of the first hierarchy for learning having a plurality of predicted pixels;

calculating a predicted error of the predicted data of the first hierarchy for learning with respect to the image data of the first hierarchy;

determining suitability of the corrected data in accordance with the predicted error;

repeating the correcting step until the corrected data is an optimum corrected data; and

generating optimum mapping coefficients for each class using the image data of the first hierarchy for learning and the optimum corrected data.

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24. An apparatus for decoding a coded data hierarchical coding an image data comprising:

means for receiving the coded data including at least image data of a second hierarchy, the image data of the second hierarchy having a number of pixels which is smaller than that of an image data of the first hierarchy; and

means for decoding the image data of a first hierarchy from image data of the second hierarchy,

said coded data generated by the steps of:

extracting a plurality of pixels of an image data of a first hierarchy and generating class information corresponding to characteristics of the extracted plurality of pixels; and

reading mapping coefficients corresponding to the class information from a memory in which mapping coefficients for each class are stored and predicting an image data of the second hierarchy using the image data of the second hierarchy having a number of pixels which is smaller than that of the image data of the first hierarchy.

66. A method according to claim 63, wherein the mapping coefficients for each class are generated so that a predicted error between predicted data of the image data of the first hierarchy for learning predicted using the image data of the second hierarchy and the image data of the first hierarchy for learning is minimum.

68. A method according to claim 63, wherein the mapping for each class is generated by the steps of:

extracting a plurality of pixels of image data of a first hierarchy for learning and generating class information corresponding to the characteristics of the extracted plurality of pixels;

predicting image data of the second hierarchy where a number of pixels for the image data of the first hierarchy is greater than a number of pixels for the image data of the second hierarchy using the image data of the first hierarchy and mapping coefficients corresponding to the class information;

predicting the image data of the first hierarchy in accordance with the image data of the second hierarchy and generating predicted data having a plurality of predicted pixels;

generating a predicted error of the predicted data of the image of the first hierarchy with respect to the image data of the first hierarchy;

updating the mapping coefficients in accordance with the predicted error until the mapping coefficients are optimum mapping coefficients; and

determining the optimum mapping coefficients.

69. A method according to claim 63, wherein the mapping for each class is generated by the steps of:

forming image data of the second hierarchy having a number of pixels that is smaller than that of image data of the first hierarchy;

correcting the image data of the second hierarchy and generating corrected data;

predicting the image data of the first hierarchy in accordance with the corrected data and generating predicted data of the first hierarchy having a plurality of predicted pixels;

calculating a predicted error of the predicted data of the first hierarchy with respect to the image data of the first hierarchy;

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determining suitability of the corrected data in accordance with the predicted error;

repeating the correcting step until the corrected data is optimum; and

generating optimum mapping coefficients for each class using the image data of the first hierarchy and the optimum corrected data.

70. A method of decoding a coded data hierarchical coding an image data comprising:

receiving the coded data including at least image data of a second hierarchy, the image data of the second hierarchy having a number of pixels which is, smaller than that of an image data of a first hierarchy; and

decoding the image data of the first hierarchy from image data of the second hierarchy,

said coded data generated by the steps of:

extracting a plurality of pixels of an image data of a first hierarchy and generating class information corresponding to characteristics of the extracted plurality of pixels; and

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reading mapping coefficients corresponding to the class information from a memory in which mapping coefficients for each class are stored and predicting an image data of the second hierarchy using the image data of the second hierarchy having a number of pixels which is smaller than that of the image data of the first hierarchy.

74. A method according to claim 70, wherein

the mapping coefficients for each class are generated so that predicted error between predicted data of the image data of the first hierarchy for learning predicted using the image data of the second hierarchy and the image data of the first hierarchy for learning is minimum.

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75. A method according to claim 70, wherein

the mapping coefficients for each class are generated so that predicted error between predicted data of the image data of the first hierarchy for learning predicted using image data of the second hierarchy and the image data of the first hierarchy for learning is less than prescribed threshold values.

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123. A method of transmitting hierarchically coded image data, the method comprising:

receiving the hierarchically coded image data, and

transmitting the hierarchically coded image data,

wherein the hierarchically coded image data has been formed by steps of:

extracting a plurality of pixels of image data of a first hierarchy and generating class information corresponding to characteristics of the extracted plurality of pixels;

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storing mapping coefficients for each class; and

reading mapping coefficients corresponding to the class information and predicting image data of a second hierarchy using the image data of the first hierarchy and the read mapping coefficients, the image data of the second hierarchy having a number of pixels which is smaller than that of the image data of the first hierarchy.

126. The method according to claim 123, wherein the mapping coefficients for each

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class are generated so that a predicted error between predicted data of the image data of the first hierarchy for learning predicted using the image data of the second hierarchy and the image data of the first hierarchy for learning is minimum.

129. The method according to claim 123, wherein the mapping for each class is generated by the steps of:

forming an image data of the second hierarchy having a number of pixels that is

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smaller than that of an image data of the first hierarchy for learning;

correcting the image data of the second hierarchy and generating a corrected data;

predicting the image data of the first hierarchy for learning in accordance with the corrected data and generating a predicted data of the first hierarchy for learning having a plurality of predicted pixels;

calculating a predicted error of the predicted data of the first hierarchy for learning with respect to the image data of the first hierarchy;

determining suitability of the corrected data in accordance with the predicted error;

repeating the correcting step until the corrected data is an optimum corrected data; and

generating optimum mapping coefficients for each class using the image data of the first hierarchy for learning and the optimum corrected data.

133. The article of manufacture according to claim 130, wherein the mapping coefficients for each class are generated so that a predicted error between predicted data of the image data of the first hierarchy for learning predicted using the image data of the second hierarchy and the image data of the first hierarchy for learning is minimum.

135. The article of manufacture according to claim 130, wherein the mapping for each class is generated by the steps of:

extracting a plurality of pixels of image data of a first hierarchy for learning and generating class information corresponding to the characteristics of the extracted plurality of pixels;

predicting image data of the second hierarchy where a number of pixels for the image data of the first hierarchy for learning is greater than a number of pixels for the image data of the second hierarchy using the image data of the first hierarchy for learning and mapping coefficients corresponding to the class information;

predicting the image data of the first hierarchy for learning in accordance with the coded image data and generating predicted data having a plurality of predicted pixels;

generating a predicted error of the predicted data of the image of the first hierarchy for learning with respect to the image data of the first hierarchy for learning;

updating the mapping coefficients in accordance with the predicted error until the mapping coefficients are optimum mapping coefficients; and

determining the optimum mapping coefficients.

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136. The article of manufacture according to claim 130, wherein the mapping for each class is generated by the steps of:

forming an image data of the second hierarchy having a number of pixels that is smaller than that of an image data of the first hierarchy for learning;

correcting the image data of the second hierarchy and generating a corrected data;

predicting the image data of the first hierarchy for learning in accordance with the corrected data and generating a predicted data of the first hierarchy for learning having a plurality of predicted pixels;

calculating a predicted error of the predicted image data of the first hierarchy for learning with respect to the image data of the first hierarchy;

determining suitability of the corrected data in accordance with the predicted error;

repeating the correcting operation until the corrected data is an optimum corrected data; and

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generating optimum mapping coefficients for each class using the image data of the first hierarchy for learning and the optimum corrected data.

138. (Amended) [The apparatus of claim 30, and further comprising:]

An apparatus for performing a hierarchical coding; comprising:

means for forming an image data of a second hierarchy having a number of pixels which is smaller than that of an image data of a first hierarchy;

means for forming an image data of a third hierarchy having a number of pixels

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which is smaller than that of an image data of the second hierarchy;

means for correcting the image data of the third hierarchy and generating a corrected data of the third hierarchy;

first predicting means for generating a prediction value of the second hierarchy, having a plurality of pixels, in accordance-with the corrected data of the third hierarchy;

second predicting means for generating a prediction value of the first hierarchy, having a plurality of pixels, in accordance with the prediction value of the second hierarchy;

error generating means for generating a predicted error of the prediction value of the first hierarchy with respect to the image data of the first hierarchy;

means for determining suitability of the corrected data of the third hierarchy in accordance with the predicted error; and

means for outputting the corrected data as the image data of the third hierarchy in accordance with the determined result.

139. (Amended) [The method of claim 47, and further comprising:]

A method of performing a hierarchical coding, comprising:

forming an image data of a second hierarchy having a number of pixels which is smaller than that of an image data of a first hierarchy;

correcting the image data of the second hierarchy and generating a corrected data;

predicting the image data of the first hierarchy in accordance with the corrected data and generating a predicted data of the first hierarchy having a plurality of predicted pixels;

calculating a predicted error of the predicted data of the first hierarchy with respect to the image data of the first hierarchy;

determining suitability of the corrected data in accordance with the predicted error; and

outputting the corrected data as the image data of the second hierarchy in accordance with the determined result.

140. (Amended) [The method of claim 57, and further comprising:]

A method of decoding data represented by a hierarchical coding of an image, comprising:

receiving the coded data including at least image data of a second hierarchy having a number of pixels which is smaller than that of an image data of a first hierarchy;

decoding the image data of the first hierarchy from image data of the second hierarchy by steps of:

forming the image data of the second hierarchy and generating a corrected data;

predicting the image data of the first hierarchy in accordance with the corrected data and generating a predicted data of the first hierarchy having a plurality of predicted pixels;

calculating a predicted error of the predicted data of the first hierarchy with respect to the image data of the first hierarchy;

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determining suitability of the corrected data in accordance with the predicted error;

repeating the step of generating corrected data as necessary until the corrected data becomes an optimum corrected data; and

outputttting the optimum corrected data as the image data of the second hierarchy.

142. (Amended) (The method of claim 93, and further comprising:]

A method of performing a hierarchical coding, comprising:

forming an image data of a second hierarchy having a number of pixels which is

B 12 smaller than that of an image data of a first hierarchy;

correcting the image data of the second hierarchy and generating a corrected data;

predicting the image data of the first hierarchy in accordance with the corrected data and generating a predicted data of the first hierarchy having a plurality of predicted pixels;

calculating predictive error of the predicted data of the first hierarchy with respect to the image data of the first hierarchy;

determining suitability of the corrected data in accordance with the predicted error;

transmitting the corrected data as the image data of the second hierarchy in accordance with the determined result.